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DEPARTMENT CIRCULAR

DEQ-12B

Nutrient Standards Variances

GENERAL INTRODUCTION

This circular (DEQ-12B) contains information about variances from the base numeric nutrient standards. This information includes details on effluent treatment requirements associated with general nutrient standards variances, as well as effluent treatment requirements for individual nutrient standards variances and to whom they apply.

Circular DEQ-12A contains the base numeric nutrient standards' concentration limits, where the standards apply, and their period of application. Circular DEQ-12A is in a separate document also available from the Department. Circular DEQ-12A is adopted by the Board of Environmental Review under its rulemaking authority in §75-5-301(2), MCA. Unlike DEQ-12A, DEQ-12B (this circular) is not adopted by the Board of Environmental Review. DEQ-12B is adopted by the Department following its formal rulemaking process, pursuant to §75-5-313, MCA.

The Department has reviewed a considerable amount of scientific literature and has carried out scientific research on its own in order to derive the base numeric nutrient standards (see References in DEQ-12A). Because many of the base numeric nutrient standards are stringent and may be difficult for MPDES permit holders to meet in the short term, Montana's Legislature adopted laws (e.g., §75-5-313, MCA) allowing for the achievement of the standards over time via the variance procedures found here in Circular DEQ-12B. This approach should allow time for nitrogen and phosphorus removal technologies to improve and become less costly, and to allow time for nonpoint sources of nitrogen and phosphorus pollution to be better addressed.

Circular DEQ-12B

JUNE 2017 EDITION

1.0 Introduction

Elements comprising Circular DEQ-12B are found below. These elements are adopted by the Department following the Department's formal rulemaking process. Montana state law (§75-5-103 (22), MCA and 75-5-313, MCA) allows for variances from the base numeric nutrient standards (found in Circular DEQ-12A) based on a determination that the base numeric nutrient standards cannot be achieved because of economic impacts, the limits of technology, or both.

1.1 Definitions

1. **Monthly average** means the sum of the daily discharge values during the period in which the base numeric nutrient standard applies divided by the number of days in the sample. See also, *"Technical Support Document for Water Quality-based Toxics Control,"* Document No. EPA/505/2-90-001, United States Environmental Protection Agency, 1991.
2. **Pollutant Minimization Program** means a structured set of activities to improve processes and pollutant controls that will prevent and reduce nutrient loadings.

2.0 General Nutrient Standards Variances

The general variance treatment requirements in **Table 12B-1** (below) apply to permittees where the Department adopts base numeric nutrient standards that would result in substantial and widespread economic impacts and the economic analysis demonstrates that the facility would have to use reverse osmosis to meet the standards. The requirements in **Table 12B-1** represent the highest attainable condition and must be reviewed by the Department before July 1, 2020. The Department will process the general variance request through the discharge permit and include information on the period of the variance and the interim requirements. A person may apply for a general variance for either total phosphorus or total nitrogen, or both. §75-5-313(8), MCA, authorizes the general variance for a period not to exceed 20 years. Through the permitting process and the specific details of each facility, the time required will be as short as possible. A compliance schedule to meet the treatment requirements shown in **Table 12B-1** may also be granted on a case-by-case basis. The final permit limit will be expressed as a load only, and when developing monthly average permit limits for general variances for the ≥ 1 MGD and < 1 MGD discharge categories, a coefficient of variation (CV) of 0.6 shall be used to determine the Table 5-2 multiplier. Table 5-2 is a component of the permit calculation process and is found in *United States Environmental Protection Agency* (1991) which is cited in Endnote 1.

Cases will arise in which a permittee is or has been discharging effluent with nitrogen and/or phosphorus concentrations lower than (i.e., better than) the minimum requirements of a general variance, but the resulting concentrations at the edge of the mixing zone still exceed the base numeric

nutrient standards. Such permitted discharges are within the scope of the general variance, because the statute contemplates that a general variance is allowable if a permittee treats the discharge to, **at a minimum**, the concentrations in **Table 12B-1**. Therefore, for permittees whose effluent concentrations were, before July 1, 2017, lower than the concentrations in **Table 12B-1**, the general variance shall be based on the actual total N and/or total P concentrations of their effluent. For permittees who, after July 1, 2017, attain or do better than the **Table 12B-1** values, the **Table 12B-1** values shall establish the permit limits until the next triennial review is completed. In a permitted discharge, the interim limits provided for under a variance will apply, even if such limits differ from those that might otherwise apply based on a wasteload allocation derived in a Total Maximum Daily Load (TMDL). The interim limits will apply during the time period over which the variance is applicable.

Table 12B-1. General variance end-of-pipe treatment requirements.

Discharger Category ²	Monthly Average	
	Total P (µg/L)	Total N (µg/L)
≥ 1.0 million gallons per day ^{3,4}	TBD	TBD
< 1.0 million gallons per day ^{3,4}	TBD	TBD
Lagoons not designed to actively remove nutrients	Maintain long-term average ⁵ and implement the PMP	Maintain long-term average ⁵ and implement the PMP

² See Endnote 2

³ See Endnote 3

⁴ See Endnote 4

⁵ See Endnote 5

§75-5-313(7)(a) and (b), MCA requires the Department to review the general variance treatment requirements every three years to assure that the justification for their adoption remains valid. The purpose of the review is to determine whether there is new information that supports modifying (e.g., revising the interim effluent treatment requirements) or terminating the variance. The review will occur triennially and will be carried out at a state-wide scale, i.e., the Department will consider the aggregate economic impact to dischargers within a category (the > 1 MGD category, for example). The Department, in consultation with the Nutrient Work Group, will consider whether a pollutant control technology for treating nitrogen and phosphorus is (1) now feasible to attain (i.e., the cost of such pollutant control technology will not cause substantial and widespread social and economic impacts) using all existing and readily available information, and (2) would result in a more stringent treatment requirements than the requirements in **Table 12B-1**. The Department shall adopt general variance requirements that reflect the highest attainable condition consistent with this review, and revised effluent limits revised effluent limits will be included with the permit during the next permit cycle, unless the demonstrations discussed in **Section 3.0** below are made. A compliance schedule may also be granted to provide time to achieve

compliance with revised effluent limits.

Based on the triennial review, the Department will issue a solicitation for public comment on the nutrient concentrations and conditions associated with the general variance. This solicitation will be conducted through: (1) a rulemaking if changes to the general variance are proposed; or (2) a request for public comment if no changes to the general variance are proposed. If the Department fails to conduct the triennial review as specified at Section 75-5-313(7), MCA, or if the results of the triennial review are not submitted to EPA within 30 days of the completion of the review, the variance will not be applicable for purposes of the Federal Clean Water Act until the review is completed and submitted to EPA.

2.1 Time to Achieve the Treatment Requirements in Table 12B-1

Through the MPDES permitting process for each facility, the time necessary to meet the treatment requirements in **Table 12B-1** will be established and will be as short as possible, but might take the entire remaining variance period. The Department has identified up to nine steps for facilities in the ≥ 1 MGD and < 1 MGD discharge categories to achieve the **Table 12B-1** treatment requirements. These steps are shown in **Table 12B-2**. The steps are a combination of advanced operational strategies using existing facility infrastructure, and capital improvements; approximate times (in years) for each step are shown. If a facility were to achieve the **Table 12B-1** treatment requirements using a subset of the steps in **Table 12B-2**, the Department would expect the discharger to need less time to complete that subset of steps.

For the lagoon discharge category, the Department expects that it will take approximately ten years to complete the entire pollution minimization program, which is described next in **Section 2.3** and **Section 2.3.2**.

Table 12B-2. Steps and Approximate Times for Permittees in the ≥ 1 MGD and < 1 MGD Discharge Categories to Achieve the Treatment Requirements in Table 12B-1.

Description of Step	Approximate Time to Complete Step (years)
1. Implementation of advanced operational strategies to reduce nutrients using existing infrastructure. Evaluate effects of operational changes and fine tune as necessary. Operations staff identify potential minor capital improvements, if any, that could be made to further advance operational strategies. Prepare optimization study, as required in Section 2.2 of this circular, including documentation of operational changes and results as well as a preliminary feasibility assessment of the viability of trading, reuse, etc.	2
2. If Table 12B-1 treatment requirements are not achieved , hire an engineer to prepare a preliminary engineering report (PER) that evaluates options for minor and/or major facility improvements, trading or reuse that lead to further nutrient reductions that build upon developed operational strategies, if appropriate. Continue to fine-tune operational strategies. Begin discussion with funding agencies and submit PERs to those agencies, if necessary (for major upgrades).	1
3. Go through funding agency timelines and requirements for planning, if necessary. This may involve legislative approval. Implement minor facility improvements, if appropriate, and fine tune operations for further TN and TP reductions.	2
4. Design major capital improvements. Go through the Department (DEQ) and other funding agency review and approval processes for the design/bidding phase, including MEPA analysis, adjustments of rates and charges, legal opinions, etc. Bid major capital project.	2
5. Construct major capital project, including trading and/or reuse, if appropriate. Begin operating new infrastructure and fine tuning operations. Continue with advanced operational training with new infrastructure. Evaluate nutrient reductions achieved with major capital project and operator optimization.	4
6. If Table 12B-1 treatment requirement are still not achieved , hire engineer to evaluate alternatives in a PER for next steps to meet Table 12B-1 treatment requirements for TN and TP.	1
7. Submit PER to funding agencies for review, approval, MEPA, etc. Legislative approval required? Obtain funding.	2
8. Design and bid capital project to meet Table 12B-1 treatment requirements for TN and TP.	1
9. Construct capital upgrades, including trading, reuse, etc., if appropriate. Continue with operational optimization to meet Table 12B-1 treatment requirements.	2

2.2 Wastewater Facility Optimization Study

Permittees receiving a general variance are required to evaluate current facility operations in order to optimize nutrient reduction with existing infrastructure and shall analyze cost-effective methods of reducing nutrient loading including, but not limited to, nutrient trading without substantial investment in new infrastructure (§75-5-313(9)(a), MCA). The Department encourages permittees to examine a full array of reasonable options including, but not limited to, facility optimization, reuse, recharge, and land application. Permittees must complete an optimization study within 2 years from the date the discharger obtains coverage under the general variance and submit the recommendations for facility optimization to the Department within 60 days of completion. The Department will incorporate the improved processes and controls identified through the optimization study into the permittee's next MPDES permit.

Changes to facility operations resulting from the analysis carried out as above are only intended to be refinements to the wastewater treatment system already in place. Therefore, optimizations:

1. should only address changes to facility operation and maintenance and should not be structural changes;
2. should not result in rate increases or substantial investment; and
3. must include exploration of the feasibility of nutrient trading within the watershed.

How the analysis is to be conducted, and by whom, is left to the discretion of the permittee. The Department encourages the use of a third-party firm with expertise in this subject.

2.3 Pollutant Minimization Program

Where no additional feasible pollutant control technology to reduce pollutant loadings can be identified, the highest attainable condition—that is, the treatment requirements in **Table 12B-1**—must reflect the greatest pollutant reduction achievable via optimization of the currently installed pollutant control technologies (**Section 2.2**) and the implementation of a Pollutant Minimization Program (PMP). When developing a PMP, permittees must examine a broad set of pollutant reduction options that could further reduce nitrogen and phosphorus removal. Permittees may receive a compliance schedule to allow time to implement the requirements.

2.3.1. Mechanical Plants

Permittees with mechanical treatment systems are required to:

- Examine all possible pollutant minimization activities including, but not limited to: Training of operations staff in advanced operational strategies, implementation of advanced operational strategies, minor changes to infrastructure to compliment and further advance operational strategies, and evaluation of opportunities for pollutant trading and the reuse of effluent.
- Before permit issuance, permittees are required to submit a report to the Department describing the activities that were examined; and, a list of the activities the permittee proposes to implement, along with an implementation schedule and rationale for selecting

the activities. The permittee will implement the approved PMP activities in accordance with the schedule. The Department will incorporate the PMP activities and associated schedule into the permittee's next MPDES permit. Permittees may receive a compliance schedule to allow time to implement any of these requirements.

Through the triennial review process, the Department will reevaluate the optimizations and PMP activities every 3 years.

2.3.2. Wastewater Lagoons

For lagoons, the Department and the permittees will implement the PMP described below to examine potential treatment technologies. Permittees will be required to implement specific PMP activities identified through the examination of pollutant control technologies.

Requirements of the Department's PMP include:

- Implementing pilot studies before the 2020 triennial review to examine the use of novel, low-maintenance technologies to reduce nutrient concentrations in lagoon system effluent. Based on final results from these studies, the Department will determine for each lagoon system if installing one of these methods is effective and technologically and economically feasible. Where feasible, the Department shall incorporate the relevant activities into the lagoon's next MPDES permit.
- Conducting a statewide review of lagoon performance by (2018?) to evaluate effective operational methods and identify those lagoons that require additional improvements. Within 1 year of completing this review, the Department will begin requiring implementation of the improvements that do not require substantial investment or additional study.
- Evaluating the facility-specific recommendations and documentation submitted by each lagoon permittee as part of their optimization study. The Department will also evaluate the capability of each discharger to implement pollutant control technologies to reduce nutrient loadings. Feasible activities will be incorporated into the discharger's next MPDES permit.

Permittees that receive a general variance are required to:

- Provide sufficient information to allow the Department to evaluate the performance of the PMP activities.

3.0 Individual Nutrient Standards Variances

The following sections describe (1) the basis for an individual nutrient standards variance ("individual variance"), and (2) an alternate method for deriving appropriate interim effluent limits for an individual discharger. For both of these types of individual variances, the final permit limit will be expressed as a load only, and when developing monthly average permit limits for individual variances for the ≥ 1 MGD and < 1 MGD discharge categories, a coefficient of variation (CV) of 0.6 shall be used to determine the Table 5-2 multiplier. Table 5-2 is a component of the permit calculation process and is found in *United States Environmental Protection Agency* (1991) which is cited in Endnote 1.

3.1 Individual Variance Based on Substantial and Widespread Economic Impacts

Montana law allows for the granting of nutrient standards variances based on the particular economic and financial situation of a permittee (§75-5-313(1), MCA). Individual variances may be granted on a case-by-case basis because the attainment of the base numeric nutrient standards is precluded due to economic impacts, limits of technology, or both. Individual variances discussed in this section are generally intended for permittees who would have financial difficulties meeting the general variance treatment requirements and are seeking individual nitrogen and phosphorus permit limits tailored to their specific economic situation.

Like the general variance in **Section 2.0**, statute (§75-5-313(8), MCA) authorizes individual variances for a period not to exceed 20 years, and each must be reviewed by the Department every three years to ensure that the justification remains valid. The duration of any individual variance must only be as long as necessary to meet achieve the highest attainable condition and the permittee must provide documentation to support the duration request. Unlike the general variances discussed in **Section 2.0**, the Department will only grant an individual variance to a permittee after the permittee has made a demonstration to the Department that meeting the underlying standards would require water quality-based controls that result in substantial and widespread social and economic impacts. The variance application will identify the lowest (i.e., best) effluent concentration that is feasible based on achieving the highest attainable condition. A permittee, as part of this assessment process, must also demonstrate to the Department that there are no reasonable alternatives including, but not limited to, trading, compliance schedules, reuse, recharge, and land application that would allow compliance with the base numeric nutrient standards. If no reasonable alternatives exist, then an individual variance is justifiable and becomes effective and may be incorporated into a permit following the Department's formal rulemaking process. At the time that the facility achieves the highest attainable condition, the permittee must submit a pollution minimization plan (PMP) to the Department (see details on PMPs in **Section 2.3**). Like any variance, individual variances must be adopted as revisions to Montana's water quality standards and submitted to EPA for approval. Individual variances the Department may adopt in the future will be documented in **Table 12B-3** below.

Since the basis of this type of individual variance is related to the economic status of a community or permittee, or to the limits of technology, at each triennial review the Department will consider if the basic economic status of that community or permittee, or the limits of technology, has substantially changed. The same parameters used to justify the original individual variance will be considered. If new, low-cost nutrient removal technologies have become widely available, or if the economic status of the community or permittee has sharply improved, the basis of the variance may no longer be justified. If the variance is still justified, the highest attainable condition shall be changed to reflect this more stringent condition based upon the new information. In such cases the Department will discuss with the permittee the options going forward including, but not limited to, a permit compliance schedule, trading, reuse, recharge, land application, or a general variance. If a facility achieves the highest attainable condition prior to the end of the variance term, the Department shall identify a new highest

attainable condition during the next triennial review. Where there is no additional feasible pollutant control technology, the new highest attainable condition identified must include the submittal and implementation of a pollution minimization plan (PMP) to the Department (see details on PMPs in **Section 2.3**). Based on the triennial review, the Department will issue a solicitation for public comment on the individual variances. This solicitation will be conducted through: (1) a rulemaking if changes to an individual variance are proposed; or (2) a request for public comment if no changes to an individual variance are proposed. If the Department fails to conduct the triennial review as specified at Section 75-5-313(7), MCA, or if the results of the triennial review are not submitted to EPA within 30 days of the completion of the review, the variance will not be applicable for purposes of the Federal Clean Water Act until the review is completed and submitted to EPA.

3.2 Individual Variance Effluent Limits Based on Site-specific Water Quality Modeling

Generally, the interim effluent limits in any variance, general or individual, will be based on achieving the highest attainable condition within the receiving water. In some cases a permittee may be able to demonstrate, using water quality modeling and reach-specific data, that greater emphasis on reducing one nutrient (target nutrient) will achieve the highest attainable condition, since it would produce comparable water quality and biological conditions in the receiving water as could be achieved by emphasizing the equal reduction of both nutrients (i.e., both nitrogen and phosphorus). Requiring such a permittee to immediately install sophisticated nutrient-removal technologies to reduce the non-target nutrient to levels in **Table 12B-1** may not be the most prudent nutrient control expenditure, and could cause the discharger to incur unnecessary economic expense. In such a case, the interim effluent limits for the individual discharger may be adjusted to reflect greater emphasis on controlling one of the parameters, so long as the highest attainable condition is maintained within the receiving water. The permittee will be required to submit the demonstration with the proposed interim effluent limits to the Department for review and will be required to provide monitoring water quality data that can be used to determine if the justifications for the interim effluent limits continue to hold true (i.e., status monitoring). Because status can change, for example due to substantive nonpoint source cleanups upstream of the discharger, status monitoring by the discharger is required.

The nutrient concentrations identified via this modeling may eventually be adopted as site-specific standards under the Board of Environmental Review's rulemaking authority in §75-5-301(2), MCA, but would require an analysis of their downstream effects prior to adoption.

Table 12B-3. Table for individual variances that may be adopted.

MPDES Number	Facility Name	Discharge Latitude	Discharge Longitude	Receiving Waterbody	Receiving Waterbody Classification	Monthly Average		Start Date	Sunset Date (maximum)	Review Schedule (year)	Review Outcome
						Total P (µg/L)	Total N (µg/L)				

4.0 Endnotes

(1) United States Environmental Protection Agency. 1991. *Technical Support Document for Water Quality-based Toxics Control*. EPA/505/2-90-001, PB91-127415. Office of Water, Washington, D.C. March 1991.

(2) Based on facility design flow.

(3) Facilities that are already meeting the treatment requirements for one or both nutrients in **Table 12B-1**, and that have demonstrated that there are no additional feasible pollutant control technologies that can be identified must continue to meet these levels and are required to implement the Pollutant Minimization Program in **Section 2.3** of this Circular.

(4) If the Department believes that a non-POTW permittee can achieve a treatment level better than (i.e., at a lower concentration than) the general variance requirements in **Table 12B-1**, then the permittee and the Department shall discuss what treatment level can be achieved and come to agreement on the level of treatment required in the permit.

(5) For lagoons, the long term average is calculated as the arithmetic average of representative facility data from the past 3 years, or up to the past 5 years if those data are also representative.